

Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Jun 2020

Project Reference Number

NIA_CAD0059

Project Registration

Project Title

No Power Hot Water Phase 2

Project Reference Number

NIA_CAD0059

Project Licensee(s)

Cadent

Project Start

June 2020

Project Duration

0 years and 11 months

Nominated Project Contact(s)

Rebecca Payne – Innovation Project Manager

Project Budget

£168,600.00

Summary

GDNs currently have a licence condition to provide fan heaters & hot plates to the most vulnerable customers during a gas outage to stay warm, heat water & food. However, some customers will not be able transfer the hot water to a bowl or sink to be able to wash or clean with. Additional cost to the customer to use alternative power to heat water has also been considered. There are occasions when the electricity is also disrupted so this solution would also resolve the issue for customers during both electricity & gas outages.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

GDNs currently have a licence condition to provide fan heaters & hot plates to the most vulnerable customers during a gas outage to stay warm, heat water & food. However, some customers will not be able transfer the hot water to a bowl or sink to be able to wash or clean with. Additional cost to the customer to use alternative power to heat water has also been considered. There are occasions when the electricity is also disrupted so this solution would also resolve the issue for customers during both electricity & gas outages.

Method(s)

Building on the research previously undertaken by NPL, this phase of work will investigate two potential candidate heat storage and release solutions.

Scope

It is envisaged that the project will be executed utilising the Cadent change management approach with defined success criteria for each of the stages and deliverables.

The sanction value is to fund the first phase of work which will continue the research and then the development of heating water without power. This will be completed in 10 months with the completed designs for three potential solutions.

- Sodium acetate phase change material (PCM)
- Non-toxic, non-flammable, cheap and available in large quantities.

- Reusable
- Sodium acetate phase change material (PCM) with Doping (additional chemicals added to increase heat exchange)
- Non-toxic, non-flammable, cheap and available in large quantities.
- Reusable
- Battery connected to heat mat or coil
- Well established methods for connecting coils or heater mats
- Reusable
- Environmentally friendly

Objective(s)

The project will be led by National Physics Laboratory (NPL). They have been chosen for their expertise in thermal development, temperature measurements & control.

Key Objectives & Deliverables:

At the end of this phase we will have agreed three design drawings with specifications for each outlined. We will then be able to decide on which we would take forward to prototyping and further testing within the laboratory.

This phase is split into 4 work packages for each technique & has five outputs:

- Technology Investigation & requirements specification report.
- Concept designs & report
- Detailed designs & report
- Engineering drawings & pre-manufacture report
- Final Report & next steps

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Solution designs, engineering drawings & final report to take forward for development in next phase of prototyping and testing.

Project Partners and External Funding

Energy Innovation Centre & National Physics Laboratory

The project will be wholly funded by the NIA

Cost for project inc Externals, Internals & Contingency = £227,460

Potential for New Learning

This research & design work will feed into the next phase to develop and manufacture.

Scale of Project

The scale of this project will be across all Cadent networks however learnings will inform all Gas Distribution Networks which all utilise the PSR database to manage their customers who would be in vulnerable situations. The scale of investment in this project is necessary as feasible solutions have not yet been identified heat water without power.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL4 Bench Scale Research

Geographical Area

This project will be delivered by National Physics Laboratory (NPL) & Cadent Gas Safeguarding Team.

Revenue Allowed for the RIIO Settlement

No revenue allowed for in the RIIO settlement.

Indicative Total NIA Project Expenditure

Total cost: £227,460

Plus future phases to develop & trial solutions

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

n/a

How the Project has potential to benefit consumer in vulnerable situations:

n/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

At this point the view on savings is speculative, but would improve CSAT scores. It is expected these solutions will be cheaper than current provisions offered & will provide a safe & efficient way for customers to heat water to stay clean. Also reducing the impact on electricity consumption and bills.

Please provide a calculation of the expected benefits the Solution

Not applicable as research only

Please provide an estimate of how replicable the Method is across GB

Around 15% of households within our networks are on the PSR database and would benefit from the solution during gas interruptions. This is also a possible solution for electricity customers during outages as such outages can impact the boiler.

Please provide an outline of the costs of rolling out the Method across GB.

Unknown at this time as early stages of research looking at a number of techniques.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

- A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).
- A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)
- A specific novel operational practice directly related to the operation of the Network Licensees system
- A specific novel commercial arrangement

RIIO-2 Projects

- A specific piece of new equipment (including monitoring, control and communications systems and software)
- A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven
- A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)
- A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology
- A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution
- A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

Learnings will inform all Gas Distribution Networks which all utilise the PSR database to manage their customers who would be in vulnerable situations

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

This project supports the strategy to continually improve safety & emergency. Ensuring customers are offered the best alternative whilst the supply is interrupted. This also feeds into the new strategy and RIIO2 plans for consumer vulnerability.

- Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

- Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

The only similar NIA funded project was completed by NGN (NIA_NGN_231) Temporary provision for hot water which delivered an asset management tool for the optimised selection and delivery of researched (evaluated) temporary hot water supply solutions. This research did not identify an affordable no power solution which would not impact the customers property. No other similar projects were identified on the ENA Portal.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

n/a

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

No current method of heating larger volumes of water to a safe temperature for customers to use to wash and clean with. Previous research has been conducted by NGN however did not identify a solution.

Relevant Foreground IPR

n/a

Data Access Details

n/a

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

The Network Licensee will not fund this project as business as usual due to its innovative nature of work, and the high level of risk associated with the possibility that solutions will prove to be unsuitable for this type of user application.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

This project can only be undertaken with the support of the NIA as it looks to innovatively explore possible solutions that include known technologies not previously used to heat water.

This project has been approved by a senior member of staff

Yes